Please enter 312 Amend 11/6/06 [initials]

In the Specification:

Please replace the paragraph beginning on page 14 at line 31, with the following:

Accordingly, the **magnetic sensor 10** is responsive to various ~~to various~~ physical effects upon the **magnetic circuit 38**, including but not limited to the following:

Please replace the paragraph beginning on page 15 at line 10, with the following:

3) The **door 14**, particularly the skin thereof, has a natural resonant frequency that can be excited by the at least one **first coil 42** if driven at that frequency by the at least one **first signal 44**. An impact to the **door 14** induces vibrations therein associated with the resonant frequency thereof, and with associated overtones. At this resonant frequency, if the vibrating elements of the **door 14** become constrained as by contact with an impacting object, this causes a dampening of the resonance which increases the eddy current losses in the **magnetic circuit 38**, which can be measured by the **bypass power processor 66** from the power supplied to the at least one **first coil 42**. Furthermore, the impacting object can influence the associated resonances, so that the nature of the resonances measured by the **magnetic sensor 10** provides associated information about the nature of the impact – e.g. severity -- or the nature of the impacting object. Stated in another way, the **door 14** has a natural resonant behavior, but exhibits a forced response to the impact thereof by an impacting object because of the continued interaction of the impacting object with the **door 14**.

Please replace the paragraph beginning on page 22 at line 12, with the following:

Whereas the **magnetic sensor 10** has been illustrated herein with the **door 14** as a principal sensing element, the **magnetic sensor 10** may generally be adapted to sensing the integrity of any component ~~of any component~~ capable of conducting **magnetic flux 49**, and would be advantageous for sensing large or long ferromagnetic parts. For example, the **magnetic sensor 10** can be adapted to sensing other body parts, such as fenders, that are attached to the main body of the vehicle by operatively connecting an at least one **first coil 42** between the body part and the main body at the point of attachment.

Please replace the two consecutive paragraphs beginning on page 32 at line 25, with the following:

Stated in another way, the inductance L_1' of the **first coil 42 (L_1)** is responsive to the associated coil geometry (including wire size, number of turns, and turn shape and radii) and to the reluctance of the associated **magnetic circuit 38**. Accordingly, a change to either the **magnetic circuit 38**, or the to coil geometry, -- e.g. responsive to a crash -- will cause an associated change in the associated inductance L_1' of the **first coil 42 (L_1)**, which in turn causes an associated change in the **impedance Z_L** thereof responsive to an oscillatory signal from the **oscillator 104**, which in turn causes an associated change in the **impedance Z** of the **first resonant circuit 106** to which the **first signal 44** from the **oscillator 104** is applied. Accordingly, for a **first signal 44** having a constant amplitude **V**, the resulting current **I** through the **first coil 42 (L_1)** given as **I = V / Z** will vary responsive to the value of **Z**, ~~with~~ which is responsive to and indicative of the mechanical perturbation of either the associated **magnetic circuit 38** or the **first coil 42 (L_1)**.

Furthermore, for certain types of crashes, e.g. pole impacts, the extent to which a crash induced perturbation of the **magnetic circuit 38** influences the resulting current **I** in the **first coil 42 (L_1)** is responsive to the proximity of the crash location to the **first coil 42 (L_1)**. Accordingly, in accordance with one embodiment, the magnitude of the variation in current **I** in the **first coil 42 (L_1)** can be used as a measure of the proximity of the crash to the **first coil 42 (L_1)**. In accordance with another embodiment, the variation in current **I** in the **first coil 42 (L_1)** in relation to the variation in the associated signal from one or more associated **magnetic sensing elements 50** can be used to determine the location of the crash in relation to the locations of the **first coil 42 (L_1)** and the one or more associated **magnetic sensing elements 50**. Generally, the modulation of the current **I** in the **first coil 42 (L_1)** is useful for sensing crash severity and location, and for verifying the operativeness of the **first coil 42 (L_1)**. By relatively increasing or maximizing the current **I** in the **first coil 42 (L_1)** using a **first resonant circuit 106** as described hereinabove, the associated detection sensitivity is relatively increased or maximized.

Please replace the paragraph beginning on page 34 at line 9, with the following:

The **second 144** and **third 150 demodulators**, if present, provide for detecting one or more of the magnitude, the phase and the relative phase of the respective input signals to the respective **demodulators 144, 150**. More particularly, each respective input signal comprises a carrier at the **oscillation frequency** $\mathbf{f_0}$, which carrier is modulated by a respective modulation signal, and the **demodulators 144, 150**, if present, provide for generating one or measures of amplitude or phase responsive to associated characteristics of the respective modulation signal. Depending upon their configuration, the **second 144** and **third 150 demodulators**, if present, may be connected either directly to the **processor 132**, e.g. to one or more digital inputs, or through associated **third 142** and **fourth 148 analog-to-digital converters**. Furthermore, the functions of the **second 144** and **third 150 demodulators** could be combined in a single demodulator that generates either analog or digital output signals, or both, and ~~is~~ which is appropriately connected to the **processor 132**. Yet further, one or more demodulation functions could also be carried out directly by the **processor 132** on one or more of the respective input signals. Yet further, one or all of the **demodulators 126, 144** or **150** (e.g. the **second demodulator 144** as illustrated in **Fig. 4**) may be operatively coupled to the **oscillator 104** so as to facilitate phase processing of the associated signal(s). For example, the relative phase of the current through and voltage across the **first coil 42** ($\mathbf{L_1}$) can be affected by either the opening of the **door 14**, or an impact thereto resulting from a crash.

Please replace the paragraph beginning on page 36 at line 14, with the following:

The **processor 132** senses the voltage $\mathbf{V_L}$ and current **I** signals in real time in order to either diagnose a failure of or change to either the **first coil 42** ($\mathbf{L_1}$) or elements of the associated **first resonant circuit 106**, or to discriminate a crash or other condition affecting the magnetic circuit **38**. In addition to using the magnitudes of the voltage $\mathbf{V_L}$ and current **I**, the processor can also use the relative phase thereof, or the phase of either the voltage $\mathbf{V_L}$ ~~of~~ or current **I** relative to that of the **first signal 44**, in order to determine, for example, the inductance $\mathbf{L_1'}$ or impedance of the **first coil 42** ($\mathbf{L_1}$), the resistance $\mathbf{R_{L1}}$ thereof, or the resistance of the **first resonant circuit 106**.

Please replace the paragraph beginning on page 42 at line 6, with the following:

Referring to **Fig. 4**, in accordance with a sixth embodiment of the **magnetic sensor 100.6**, the **oscillator 104** may be adapted to be controllable responsive to a **signal 174** from the **processor 132**. For example, the **oscillator 104** may be a voltage controlled oscillator (VCO). In operation, the **oscillation frequency f_0** of the **oscillator 104** is swept through – in either a stepwise or continuous fashion -- the associated resonant frequency **f_n** of the **first resonant circuit 106**. An output from the oscillator can be coupled to the **processor 132**, either directly, or, if analog, through a **fifth analog-to-digital converter 176**, so as to provide a measure of~~,~~ the output from the oscillator, for example, the **oscillation frequency f_0** or associated level **V** of the **first signal 44**. For example, the **processor 132** could directly sense the **first signal 44**, and then determine the associated level **V** and **oscillation frequency f_0** directly therefrom. The particular resonant frequency can then be identified as the **oscillation frequency f_0** for which the voltage across either the **first coil 42 (L_1)**, the **first capacitor 108 (C_S)** or the **resistor 110 (R_S)** is maximized, and the associated inductance **L_1'** of the **first coil 42 (L_1)** can be identified therefrom. Similarly, the associated inductance **L_2'** of the **second coil 54 (L_2)** can be identified after determining by similar means the resonant frequency **f_{n_2}** of the **second resonant circuit 116**.

Please replace the two consecutive paragraphs beginning on page 47 at line 21, with the following:

The magnetic circuit **222.1** associated with the **first coil 216.1** of the **first magnetic sensor 202** includes both **second locations 230.1** and **230.2** respectively associated with the **first 202** and **second 204 magnetic sensors** respectively. Similarly, the magnetic circuit **222.2** associated with the **first coil 216.2** of the **second magnetic sensor 204** includes both **second locations 230.2** and **230.1** respectively associated with the **second 204** and **first 202 magnetic sensors** respectively. Accordingly, **magnetic flux 49, ϕ** generated by the **first coil 216.1** of the **first magnetic sensor 202** is sensed by the **magnetic sensing element 224.2** of the **second magnetic sensor 204**, and **magnetic flux 49, ϕ** generated by the **first coil 216.2** of the **second magnetic sensor 204** is sensed by the **magnetic sensing element 224.1** of the **first magnetic sensor 202**. The **third resonant circuits 240.1, 240.2** are series resonant, and accordingly, have

a minimum resistance at their respective **resonant frequencies** $f_{3.1}$, $f_{3.2}$, so that the frequency response of current therethrough exhibits a maximum at the respective **resonant frequencies** $f_{3.1}$, $f_{3.2}$. Stated in another way, each **third resonant circuit 240.1, 240.2** acts as a current sink at its respective **resonant frequency** $f_{3.1}$, $f_{3.2}$, and a measure of current therethrough provides a measure of the magnitude of an associated frequency component of the **magnetic flux 49, ϕ,** having the corresponding **resonant frequency** $f_{3.1}$, $f_{3.2}$, that is sensed by the corresponding **first coil 216.1, 216.2**. Accordingly, the current sensed by the **current sensor 246.1** associated with the **first magnetic sensor 202** provides a measure of the operativeness and operation of the **first coil 216.2** associated with the **second magnetic sensor 204**, and the current sensed by the **current sensor 246.2** associated with the **second magnetic sensor 204** provides a measure of the operativeness and operation of the **first coil 216.1** associated with the **first magnetic sensor 202**, so that each **magnetic sensor 202, 204** can be used to verify the operation of the other, and thereby provide a measure for safing the other **magnetic sensor 204, 202**.

Responsive to a first measure of operativeness of the **first coil 216.1** associated with the **left side 206** of the **vehicle 12** – which first measure of operativeness is responsive to a signal from the **current sensor 246.2** associated with the **third resonant circuit 240.2** associated with the **second magnetic sensor 204** associated with the **right side 208** of the **vehicle 12** -- the **processor 238** provides for disabling a **first safety restraint actuator 254.1** associated with the **left side 206** of the **vehicle 12** if the first measure of operativeness indicates that the **first coil 216.1** is inoperative. Otherwise, if the **first magnetic sensor 202** is otherwise operative, then the **first safety restraint actuator 254.1** associated with the **left side 206** of the **vehicle 12** is actuated responsive to a signal from the associated **magnetic sensing element 224.1** associated with the **first magnetic sensor 202** associated with the **left side 206** of the **vehicle 12**.